

NOTES ON CESTODE CYSTS, *TENIA CHAMISSONII*, NEW
SPECIES, FROM A PORPOISE.

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On October 7, 1901, Mr. Vinal N. Edwards, of Woods Hole, Massachusetts, collected a lot of about twenty-five cysts from the mesentery of a skunk porpoise (*Lagenorhynchus acutus*) captured at Menemsha Bight, Vineyard Sound.

This material, preserved in formalin, was submitted to me in August, 1903, at which time I made a preliminary examination of it. Later some of it was stained and sectioned.

I already had in my collection a few cysts from the same host which were collected on an expedition from Woods Hole to the tile-fish grounds, July 29, 1899.

In the older lot there were two kinds of cysts, one kind similar to those of the later lot, and, like them, obtained from the body cavity. The others were smaller, and according to the label, came from the blubber. The scolex of one of these cysts was examined and proved to be a *Phyllobothrium*.

It is with the larger cysts that this paper is especially concerned.

These cysts are, for the most part, oblong-ovate and from 20 to 30 mm. in length. Their connective tissue walls are rather thick, and are dense, tough, and leathery. Upon opening one of them a slender filament, which may be as much as five or six times as long as the cyst, is seen attached to the inner wall. One of these filaments in an averaged-sized cyst measured 127 mm. in length and less than 1 mm. in diameter.

At first sight these filaments might be mistaken for nematoid worms, but a closer examination will show them to be the inverted portions of a bladder worm (cysticercus).

By careful manipulation the connective tissue layers of the cyst may be removed and the contained bladder liberated. The outer wall of the bladder is closely adherent to the inner wall of the cyst, and the bladder itself is rather fragile in the preserved specimens.

The general plan will be best understood from the figures, the explanation of which should be read.

It will be seen readily from the figures that the filiform structure is the inverted portion of the cysticercus. The relation of these parts is shown in fig. 11.

The lumen of the filiform part is lined with cuticle which, of course, becomes the external layer when the worm is everted. The scolex is provided with four suckers which may be seen in fig. 8. Furthermore the scolex appears to be truncate in front. This at least is my interpretation of the upper part of fig. 9, near the index line *m*. Near the scolex the cuticle is much crumpled (figs. 8 and 9). In longitudinal sections the lateral vessels are seen to be spiral; slightly shown in fig. 9.

The folds on the inner wall of the bladder at the origin of the filamentar portion (*i*, in figs. 1, 2, and 5) were seen only in the lot collected by Mr. Edwards. They may be due to the action of the killing fluid.

Encysted cestode worms were recorded by Rudolphi under the name *Cysticercus delphini*.^a Cobbold summarizes the literature of the subject thus:

The presence of larval cestodes has been indicated in several whales. Thus, F. Cuvier and Van Beneden state that Surgeon-Major Carnot, in 1822, found an enormous quantity of small hydatids in the nasal sinuses of a porpoise (*Phocaena compressicaudata*). These are supposed to be cysticerci. In like manner, Mr. F. D. Bennett, in 1837, obtained numerous capsuled cysticerci from the skin and blubber of *Catodon* (*Physeter*) *macrocephala*. * * *

The naturalist Bosc noticed a larval cestode in the fatty tissue surrounding the reproductive organs of *Delphinus delphis*. He called it an hydatid (*Hydatis*), and Rudolphi placed it with the *Cysticerci* (*C. delphini*). According to Van Beneden [P.-J.] the parasite in question is probably a sexually immature example of *Phyllobothrium delphini* described by his son. Edward Van Beneden found this scolex in great abundance in a dolphin (*D. delphis*), which he dissected at Concarneau in 1868. (*Parasites of Man and Animals*, pp. 421-422.)

The cysts described by Ed. Van Beneden^b undoubtedly belong to the genus *Phyllobothrium*. In like manner the description given by Rudolphi,^c under *Cysticercus delphini*, points to the genus *Phyllobothrium*.

On the other hand, Rudolphi's account of *Cysticercus delphini*^d indicates a very different form from that recorded under the same name in his History of the Entozoa, and appears, indeed, to be identical with the cysts under consideration in this paper.

In the Synopsis^e Rudolphi gives a brief account of some very interesting specimens which had been brought to him by his very dear friend Chamisso, having been collected by the poet-naturalist in his

^a Entoz. Hist., II, Pt. 2, p. 236; Synopsis, pp. 182, 544, and 551.

^b Bull. Acad. Belgique, XXIX, 1870, p. 360.

^c Entoz. Hist., II, Pt. 2, p. 236.

^d Synopsis, p. 551.

journey around the world, and brought back to Rudolphi as a mark of his regard for the renowned helminthologist.

Unfortunately the alcohol in which the cysts had been preserved was too weak and consequently the material was not in good condition for study. So that nothing remained except the hard external vesicle, which, he states, is harder and more coriaceous than ordinarily (*solito duriar et coriacea*).

The cysticercus itself, he says, had lost its opening, and one of them exhibited a decidedly oblong-ovate form, with the anterior part very broad, the body and head being retracted. This he was not able to preserve even by pouring stronger alcohol upon it. Moreover, in the macerating cysticercus the interior part of the vesicle was seen to contain a filamentous portion which was somewhat long and slender, and which, when examined under the microscope, might be said to be slightly crenulated on both sides or to consist of wrinkle-like segments. The description closes with the remark that no one had ever before seen a similar structure in other cysticerci, and for that reason a further examination of the species is especially commended.

I think there can be little doubt that the description paraphrased above applies to cysts specifically identical with those which are the subject-matter of this paper, and furthermore that they are the sexually immature stage of an undescribed species of *Tenia* or closely related genus.

Since it is desirable that there should be a definite name for these highly characteristic cysts, the new specific name *Tenia chamissonii* is proposed for them.

Cobbold indicates the probable final host of *Cysticercus delphini* thus:

The sexually mature state of this worm, as the Belgian savants (Beneden, father and son) remark, is to be looked for in some one or other of the larger sharks.

This will doubtless prove true, since the adult form would be a *Phyllobothrium*, and that genus is peculiar to selachians.

This will doubtless be the case with respect to the final host of *Phyllobothrium delphini*, since that genus is peculiar to selachians.

It can hardly be the fate of Chamisso's cysticercus, however, which, being a true bladder worm, and not a plerocercus, characteristic of *Phyllobothrium* and its allies, rather suggests a mammal as the final host. It is more likely therefore that the final host of Chamisso's cysticercus will be found to be some pedaceous mammal like the killer whale (*Orcinus orca*).

EXPLANATION OF PLATE XXXV.

Letters having the same meaning in the different figures:

- b.* Suckers of scolex.
bl. Bladder of cysticercus.
c, c', c''. Cyst of connective tissue inclosing bladder.
cu. Cuticle.
ex. External pore communicating with inverted portion of cysticercus.
g. Granulo-fibrous layer of inverted portion of cysticercus.
i. Folds on inner wall of bladder at point of inversion.
l. Fine longitudinal fibers.
lv. Lateral, longitudinal vessels of inverted portion of cysticercus.
m. Lumen of inverted portion of cysticercus.
p. Parenchyma.
s. Scolex.
t. Filiform inverted portion of cysticercus.

- Fig. 1. Cyst cut open on one side, showing the outer and thicker connective tissue layer *c* of the cyst proper, the inner and thinner layer *bl* or bladder, the point of inversion *i*, and the filiform, inverted portion *t*. Actual length of cyst 30 mm.
2. Bladder removed from cyst, opened and reflected, showing the filiform portion with its point of attachment and the blunt, inverted scolex. Enlarged about 2 diameters.
3. A large cyst, 48 by 40 by 22 mm. in the three principal diameters. The outer wall has been cut open and reflected, showing that what at first appeared to be one cyst has others included within its outer wall. Each of the included cysts is surrounded by connective tissue. Upon removal of the outer coat there appeared to be three cysts inclosed, *c'*. One of these, after further removal of connective tissue, was found to inclose two cysts, *c''*. In other words, the primary cyst inclosed four bladder worms, which, starting from four larvæ near together, grew and became enveloped, at first in individual cysts and later in a common cyst, *c*.
4. Cysticercus removed from cyst. The filiform portion is protruding from a perforation in the wall of the bladder.
5. Another cysticercus with a window cut in the wall to show that the filiform portion is not everted, but is perforating the wall.
6. Transverse section of filiform portion of cysticercus near the scolex. The section was 0.45 by 0.37 mm. in the two principal diameters.
7. Transverse section of filiform portion of cysticercus near middle of its length. The section was 0.66 by 0.50 mm. in the two principal diameters.
8. A nearly transverse section through the scolex.
9. A nearly longitudinal section through the scolex.
10. A cysticercus with a portion of the bladder cut away so as to show the pore on the exterior and its continuation in the filiform portion.
11. Diagram showing the relation of the bladder to the inverted filiform portion and scolex.
12. Pedicled cyst; actual length of cyst, not including pedicel, 30 mm.

Figures 1 to 7 from lot collected October 7, 1901; figures 8 to 10 and 12 from lot collected July 29, 1899.